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10/758,385	01/13/2004	HoSeong Lee	384938076US01	5450

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PERKINS COIE LLP
PATENT-SEA
P.O. BOX 1247
SEATTLE, WA 98111-1247

EXAMINER	
HENN, TIMOTHY J	
ART UNIT	**PAPER NUMBER**
2622	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/03/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/758,385	LEE, HOSEONG	
	Examiner	Art Unit	
	Timothy J. Henn	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6,8-17,19,21-29,32,34,36,38,40 and 42* is/are rejected.

7)☒ Claim(s) *5,7,18,20,30,31,33,35,37,39 and 41* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claims 10, 12, 14, 16, 23, 25, 27, 29, 36, 38, 40 and 42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

[claims 10, 12, 14, 16, 23, 25, 27, 29, 36, 38, 40 and 42]

Claims 10, 12, 14, 16, 23, 25, 27, 29, 36, 38, 40 and 42 contain the limitations "XSHIFT" and YSHIFT" and "NormalizeValue", however these terms are not defined in the claims in a sufficient manner.

[claims 16, 29 and 42]

Claims 16, 29 and 42 contain equations including the terms "<<2" and ">>3", however these terms are not defined in the claims in a sufficient manner.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-4, 6, 8, 10, 15, 17, 19, 21, 23, 28, 32 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamauchi et al. (US 2001/0045988) in view of Sato et al. (US 2003/0156204).

[claim 1]

Regarding claim 1, Yamauchi discloses a method for applying a lens correction to image data that is associated with a lens, comprising: applying a lens correction (Figure 3, Item 314; Paragraphs 0064-0065), converting the image data to a YCbCr color space (Figure 3, RGB/YCbCr) and applying image processing procedures to the YCbCr data to form processed YCbCr data (Figure 3, Items 340, 342, 344). However, Yamauchi applies the lens correction to RGB data and data converted to a luminance/chrominance color space.

Sato discloses that lens correction can be applied to luminance/chrominance data instead of RGB data (i.e. Figures 1 and 5; Paragraph 0060) so that individual corrections can be applied to the luminance and chrominance channels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to move the lens correction block of Yamauchi to at the end of the image processing section (i.e. after blocks 340, 342 and 344) as shown by Figure 5 of Sato to be able to apply corrections to the luminance and chrominance channels independently. However, Yamauchi in view of Sato describe converting RGB data to YCbCr data and not YUV. Official Notice is taken that YUV is an art recognized equivalent to YCbCr and that similar image processing can be accomplished in either YUV or YCbCr depending on the needs of the output system. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a YUV color space to convert the RGB data instead of YCbCr since YUV is an art recognized equivalent to YCbCr.

[claim 2]

Regarding claim 2, Sato discloses a method for applying lens correction in luminance and chrominance color space in which a correction value is applied to each channel by multiplication (Paragraph 0047 and 0060-0062).

[claim 3]

Regarding claim 3, Sato discloses a method for applying lens correction values in luminance and chrominance color space in which a multiplication coefficient (i.e. multiplying a Y component by a Y correction value) and an addition offset (i.e. adding a U/V correction value to a U/V component) is used (Paragraphs 0047 and 0060-0062).

[claim 4]

Regarding claim 4, Sato discloses a chrominance (i.e. U) correction value based on a distance value, wherein the distance value is associated with a location of a target pixel in a reference image from a reference point of the reference image (e.g. Paragraphs 0024-0028 and 0047).

[claim 6]

Regarding claim 6, Sato discloses correction of a chrominance channel (i.e. U) based on coefficients stored in a lookup table. The examiner notes that these coefficients must inherently have a maximum value and a minimum value. Therefore, the correction value is "based on" a maximum and minimum limit as claimed.

[claim 8]

Regarding claim 8, Sato discloses correcting an image to compensate for shading caused by a lens (e.g. Paragraph 0011). The examiner notes that the coefficients stored in the lookup table are therefore, inherently based on properties of

the lens (i.e. the property of shading caused by the lens).

[claim 10]

Regarding claim 10, Sato discloses a conventional method of determining a distance in which the distance is based on sqrt(x^2+y^2) where x and y are the distances from the pixel location to the origin (Paragraph 0006). Official Notice is taken the formula of Paragraph 0006 is a well known formula for accurately determining a distance from a point to an origin in a Cartesian coordinate system. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the equation of Paragraph 0006 to accurately determine the distance of the pixel in order to perform shading correction. The examiner notes that the values XSHIFT, YSHIFT and NormalizeValue are not defined in the claim or given any bounds of allowable values. Therefore, the examiner notes that in the case of XSHIFT=0. YSHIFT=0 and NormalizeValue=1 the claimed equation is equal to the equation disclosed by Sato.

[claim 15]

Regarding claim 15, Sato discloses performing shading correction by assuming that the target pixels lie in a plurality of concentric polygons emanating form the reference point of the reference image, wherein the plurality of concentric polygons are substantially ring shaped (Figure 8B; Paragraph 0024).

[claim 17]

Regarding claim 17, Sato discloses a chrominance (i.e. V) correction value based on a distance value, wherein the distance value is associated with a location of a

target pixel in a reference image from a reference point of the reference image (e.g. Paragraphs 0024-0028 and 0047).

[claim 19]

Regarding claim 19, Sato discloses correction of a chrominance channel (i.e. V) based on coefficients stored in a lookup table. The examiner notes that these coefficients must inherently have a maximum value and a minimum value. Therefore, the correction value is "based on" a maximum and minimum limit as claimed.

[claim 21]

Regarding claim 21, Sato discloses correcting an image to compensate for shading caused by a lens (e.g. Paragraph 0011). The examiner notes that the coefficients stored in the lookup table are therefore, inherently based on properties of the lens (i.e. the property of shading caused by the lens).

[claim 23]

Regarding claim 23, Sato discloses a conventional method of determining a distance in which the distance is based on sqrt(x^2+y^2) where x and y are the distances from the pixel location to the origin (Paragraph 0006). Official Notice is taken the formula of Paragraph 0006 is a well known formula for accurately determining a distance from a point to an origin in a Cartesian coordinate system. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the equation of Paragraph 0006 to accurately determine the distance of the pixel in order to perform shading correction. The examiner notes that the values XSHIFT, YSHIFT and NormalizeValue are not defined in the claim or given any bounds of

allowable values. Therefore, the examiner notes that in the case of XSHIFT=0. YSHIFT=0 and NormalizeValue=1 the claimed equation is equal to the equation disclosed by Sato.

[claim 28]

Regarding claim 28, Sato discloses performing shading correction by assuming that the target pixels lie in a plurality of concentric polygons emanating form the reference point of the reference image, wherein the plurality of concentric polygons are substantially ring shaped (Figure 8B; Paragraph 0024).

[claim 32]

Regarding claim 32, Sato discloses correction of a luminance channel (i.e. Y) based on coefficients stored in a lookup table. The examiner notes that these coefficients must inherently have a maximum value and a minimum value. Therefore, the correction value is "based on" a maximum and minimum limit as claimed.

[claim 34]

Regarding claim 34, Sato discloses correcting an image to compensate for shading caused by a lens (e.g. Paragraph 0011). The examiner notes that the coefficients stored in the lookup table are therefore, inherently based on properties of the lens (i.e. the property of shading caused by the lens).

4. Claims 9, 11, 13, 22, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamauchi et al. (US 2001/0045988) in view of Sato et al. (US

2003/0156204) in view of Enomoto (US 2002/0196472).

[claim 9]

Regarding claim 9, Yamauchi in view of Sato discloses a method of performing lens correction on YUV data, but does not disclose assuming that the target pixels lie in a plurality of concentric rings emanating from the reference point of the image. Enomoto discloses a known shading correction system which capable of rapid image correction and is based on the assumption that that the quantity of deterioration increases as it goes from the center of the image to a peripheral area as formed by a plurality of concentric circles (i.e. rings) extending radially from the center of the image. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to base the correction of Yamauchi in view of Sato on the assumption that the deterioration increases as it goes from the center of the image to a peripheral area as formed by a plurality of concentric circles (i.e. rings) extending radially from the center of the image to rapidly correct the image.

[claim 11]

Regarding claim 11, Yamauchi in view of Sato discloses a method of performing lens correction on YUV data, but does not disclose assuming that the target pixels lie in a plurality of concentric rings emanating from the reference point of the image. Enomoto discloses a known shading correction system which capable of rapid image correction and is based on the assumption that that the quantity of deterioration increases as it goes from the center of the image to a peripheral area as formed by a plurality of concentric squares (i.e. rectangles) extending radially from the center of the

image. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to base the correction of Yamauchi in view of Sato on the assumption that the deterioration increases as it goes from the center of the image to a peripheral area as formed by a plurality of concentric squares (i.e. rectangles) extending radially from the center of the image to rapidly correct the image.

[claim 13]

Regarding claim 13, Yamauchi in view of Sato discloses a method of performing lens correction on YUV data, but does not disclose assuming that the target pixels lie in a plurality of concentric rings emanating from the reference point of the image. Enomoto discloses a known shading correction system which capable of rapid image correction and is based on the assumption that that the quantity of deterioration increases as it goes from the center of the image to a peripheral area as formed by a plurality of concentric squares (i.e. rhombuses) extending radially from the center of the image. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to base the correction of Yamauchi in view of Sato on the assumption that the deterioration increases as it goes from the center of the image to a peripheral area as formed by a plurality of concentric squares (i.e. rhombuses) extending radially from the center of the image to rapidly correct the image.

[claim 22]

Regarding claim 22, Yamauchi in view of Sato discloses a method of performing lens correction on YUV data, but does not disclose assuming that the target pixels lie in a plurality of concentric rings emanating from the reference point of the image.

Enomoto discloses a known shading correction system which capable of rapid image correction and is based on the assumption that that the quantity of deterioration increases as it goes from the center of the image to a peripheral area as formed by a plurality of concentric circles (i.e. rings) extending radially from the center of the image. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to base the correction of Yamauchi in view of Sato on the assumption that the deterioration increases as it goes from the center of the image to a peripheral area as formed by a plurality of concentric circles (i.e. rings) extending radially from the center of the image to rapidly correct the image.

[claim 24]

Regarding claim 24, Yamauchi in view of Sato discloses a method of performing lens correction on YUV data, but does not disclose assuming that the target pixels lie in a plurality of concentric rings emanating from the reference point of the image. Enomoto discloses a known shading correction system which capable of rapid image correction and is based on the assumption that that the quantity of deterioration increases as it goes from the center of the image to a peripheral area as formed by a plurality of concentric squares (i.e. rectangles) extending radially from the center of the image. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to base the correction of Yamauchi in view of Sato on the assumption that the deterioration increases as it goes from the center of the image to a peripheral area as formed by a plurality of concentric squares (i.e. rectangles) extending

radially from the center of the image to rapidly correct the image.

[claim 26]

Regarding claim 26, Yamauchi in view of Sato discloses a method of performing lens correction on YUV data, but does not disclose assuming that the target pixels lie in a plurality of concentric rings emanating from the reference point of the image. Enomoto discloses a known shading correction system which capable of rapid image correction and is based on the assumption that that the quantity of deterioration increases as it goes from the center of the image to a peripheral area as formed by a plurality of concentric squares (i.e. rhombuses) extending radially from the center of the image. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to base the correction of Yamauchi in view of Sato on the assumption that the deterioration increases as it goes from the center of the image to a peripheral area as formed by a plurality of concentric squares (i.e. rhombuses) extending radially from the center of the image to rapidly correct the image.

Allowable Subject Matter

5. Claims 5, 7, 12, 14, 16, 18, 20, 25, 27, 29, 30, 31, 33 and 35-50 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The examiner notes that any rejections under 35 USC §112, 2nd Paragraph will have to be overcome before a final decision on allowability is made.

[claims 5 and 18]

Regarding claims 5 and 18, the prior art does not teach or fairly suggest a lens correction method in which a U or V correction value is based on whether the Y component of the YUV image data falls within a pre-selected luminance range as claimed. While lens correction based on whether the Y value falls within a certain range is known in the prior art for correcting the Y component (e.g. Teratani et al. (US 2004/0012696)), the prior art does not teach such a process for correcting the U or V components.

[claims 7, 20 and 33]

Regarding claims 7, 20 and 33, the prior art does not teach or fairly suggest a lens correction method for correcting YUV data based on user selected minimum and maximum correction limits as claimed.

[claims 12, 14, 16, 25, 27 and 29]

Regarding claims 12, 14, 16, 25, 27 and 29, the prior art does not teach or fairly suggest lens correction method for YUV data in which the correction value is based on a distance calculated using the claimed equations.

[claims 30 and 35-50]

Regarding claims 30 and 35-50 the prior art does not teach or fairly suggest a lens correction method for correcting YUV data in which the Y component is corrected based on a second distance value which in turn is based on a first distance value and one or more luminance parameters based on an F value of the lens. While it is known that lens aberrations change depending on the F value of the lens (e.g. Niikawa (US 2002/0135688)), the prior art does not teach a method using a second distance based

on a first distance and luminance values based on an F value as claimed.

[claim 31]

Regarding claim 31, the prior art does not teach or fairly suggest a lens correction method for correcting YUV data in which the Y correction value is based on a user selected smoothing parameter. While it is known in the art to smooth YUV data based on a user selection (i.e. for artistic effects, etc.), the prior art does not teach a lens correction method for correcting Y data based on a user selected desired amount of smoothing as claimed.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

i. Higashiyama JP 11-250240

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J. Henn whose telephone number is (571) 272-7310. The examiner can normally be reached on M-F 11-7.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivek Srivastava can be reached on (571) 272-7304. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

LIN YE
PRIMARY PATENT EXAMINER

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TJH
3/27/2007

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PRIMARY PATENT EXAMINER